# CONWAY LAKE

## 2019 SAMPLING HIGHLIGHTS

## Station – 2 Gull

### Conway and Eaton, NH

Extension

Station 2 Gull (Figure 7) was used as a reference point to represent the overall Conway Lake water quality. Water quality data displayed in Tables 1, 2 and 3 are surface water measurements with the exception of the dissolved oxygen data that summarize conditions near the lake bottom.

**Blue** = Excellent = Oligotrophic

**Yellow** = Fair = Mesotrophic

**Red** = Poor = Eutrophic

**Gray** = No Data

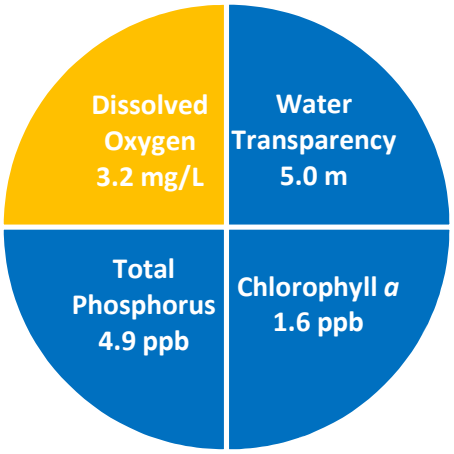



**Figure 1. Conway Lake Water Quality (2019)**

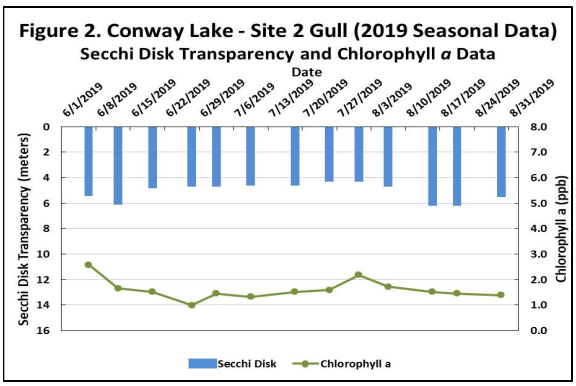
**Table 1. 2019 Conway Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]**

| Parameter | Oligotrophic "Excellent" | Mesotrophic "Fair" | Eutrophic "Poor" | Conway Lake Average (range) | Conway Lake Classification |
|---|---|---|---|---|---|
| Water Clarity (meters) | 4.0 – 7.0 | 2.5 - 4.0 | < 2.5 | **5.0** meters (4.2 – 6.1) | Oligotrophic |
| Chlorophyll *a* [1] (ppb) | < 3.3 | > 3.3 – 5.0 | > 5.0 – 11.0 | **1.6** ppb (1.0 – 2.6) | Oligotrophic |
| Total Phosphorus [1] (ppb) | < 8.0 | > 8.0 – 12.0 | > 12.0 – 28.0 | **4.9** ppb (single value) | Oligotrophic |
| Dissolved Oxygen (mg/L) | 5.0 – 7.0 | 2.0 – 5.0 | <2.0 | **3.2** mg/L (2.9 – 3.7)* | Mesotrophic |

* Dissolved oxygen concentrations were measured on August 15, 2019 between 9.0 and 11.5 meters, in the bottom waters.

**Table 2. 2019 Conway Lake Seasonal Average Accessory Water Quality Measurements**

| Parameter | Assessment Criteria | | | | | Conway Lake Average (range) | Conway Lake Classification |
|---|---|---|---|---|---|---|---|
| Color (color units) | < 10 uncolored | 10 – 20 slightly colored | 20 – 40 lightly tea colored | 40 – 80 tea colored | > 80 highly colored | **36.6** color units (range: 30.2 – 49.2) | Lightly tea colored |
| Alkalinity (mg/L) | < 0.0 acidified | 0.1 – 2.0 extremely vulnerable | 2.1 – 10 moderately vulnerable | 10.1 – 25.0 low vulnerability | > 25.0 not vulnerable | **4.2** mg/L (range: 4.0 – 4.5) | Moderately vulnerable |
| pH (std units) | < 5.5 suboptimal for successful growth and reproduction | | 6.5 – 9.0 optimal range for fish growth and reproduction | | | **7.0** standard units (range: 7.0 – 7.0) | Optimal range for fish growth and reproduction |
| Specific Conductivity (*u*S/cm) | < 50 *u*S/cm Characteristic of minimally impacted NH lakes | | 50-100 *u*S/cm Lakes with some human influence | > 100 *u*S/cm Characteristic of lakes experiencing human disturbances | | **49.4** *u*S/cm (range: 49.3 – 49.5) | Characteristic of minimaly impacted NH lakes |



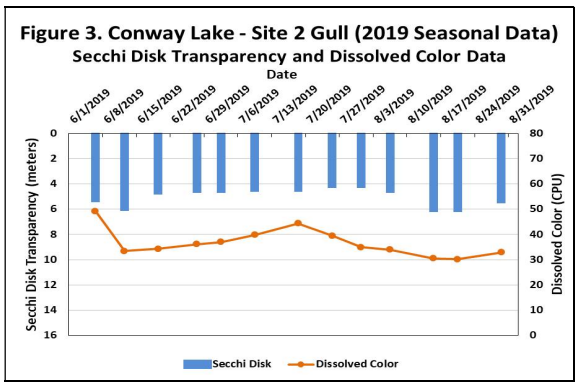




Figure 2 and 3. Seasonal Secchi Disk transparency, chlorophyll *a* changes and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *a* and/or color concentrations.

## LONG-TERM TRENDS

**WATER CLARITY:** The Conway Lake water clarity measurements, measured as Secchi Disk transparency, have been highly variable among years. However, the data collected over the thirty-seven year span display a relatively stable long-term trend. (Figure 4).

**CHLOROPHYLL:** The Conway Lake chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a trend of increasing concentrations over a thirty-seven year span (Figure 4).

**TOTAL PHOSPHORUS:** Phosphorus is the nutrient most responsible for microscopic plant growth. The Conway Lake total phosphorus concentrations display a trend of decreasing concentrations over a thirty-seven year span (Figure 5).

**COLOR:** The Conway Lake color data, the result of naturally occurring "tea" color substances from the breakdown of soils and plant materials, display a trend of increasing concentrations over a thirty-five year span (Figure 5).

**Figure 4. Conway Lake - Site 2 Gull (1983-2019)**
**Long-term Secchi Disk Transparency and Chlorophyll *a* Data**

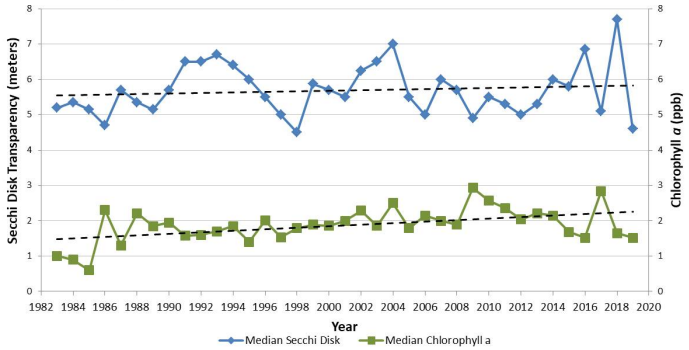



**Figure 5. Conway Lake - Site 2 Gull (1983-2019)**
**Long-term Total Phosphorus and Dissolved Color Data**

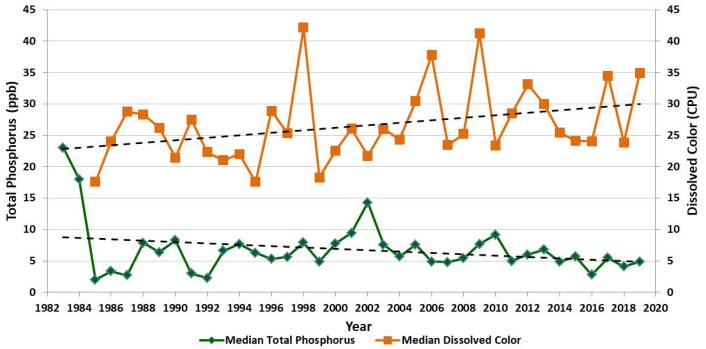



**Table 3. Conway Lake Seasonal Average Water Quality Inter-Site Comparison (2019)**

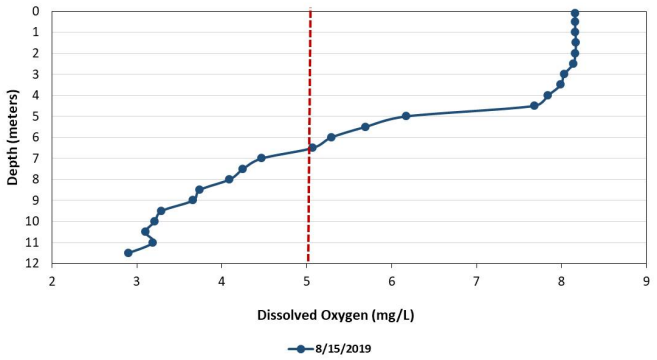
| Sampling Station | Average (range) Secchi Disk Depth (meters) | Average (range) Total Phosphorus (ppb) | Average (range) Chlorophyll *a* (ppb) | Average (range) Dissolved Color (CPU) |
|---|---|---|---|---|
| 1 Andrews | **5.3** m (4.7 – 6.8) | **5.1** ppb (single value) | **1.8** ppb (1.1 – 3.7) | **35.6** CPU (28.5 – 42.3) |
| 2 Gull | **5.0** m (4.2 – 6.1) | **4.9** ppb (single value) | **1.6** ppb (1.0 – 2.6) | **36.6** CPU (30.2 – 49.2) |
| 3 Dolloff | **4.8** m (4.0 – 6.0) | **5.0** ppb (single value) | **1.8** ppb (1.1 – 3.2) | **38.4** CPU (31.4 – 43.5) |
| South Cove | **4.8** m (3.9 – 6.0) | **6.6** ppb (single value) | **1.7** ppb (0.9 – 3.8) | **38.4** CPU (31.2 – 55.5) |
| Paige Brook | * **3.4** m (2.7 – 4.9) | **6.0** ppb (single value) | **2.0** ppb (0.8 – 5.3) | **57.2** CPU (31.4 – 95.1) |

* indicates the Secchi disk was occassionally visible on the lake bottom.

Figures 4 and 5. Changes in the Conway Lake water clarity (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1983 and 2019. **These data illustrate the relationship among plant growth, water color and water clarity. Total phosphorus data are also displayed and are oftentimes correlated with the amount of plant growth.** Long-term trends are based on the analysis of annual median values.

Figure 6. Conway Lake dissolved oxygen profile collected on August 15, 2019. The vertical red line indicates the dissolved oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish such as trout and salmon. *Notice the decreasing dissolved oxygen concentrations near the lake bottom.*

**Figure 6. Conway Lake - Site 2 Gull**
**Dissolved Oxygen Profile (August 15, 2019)**




## Reccomendations

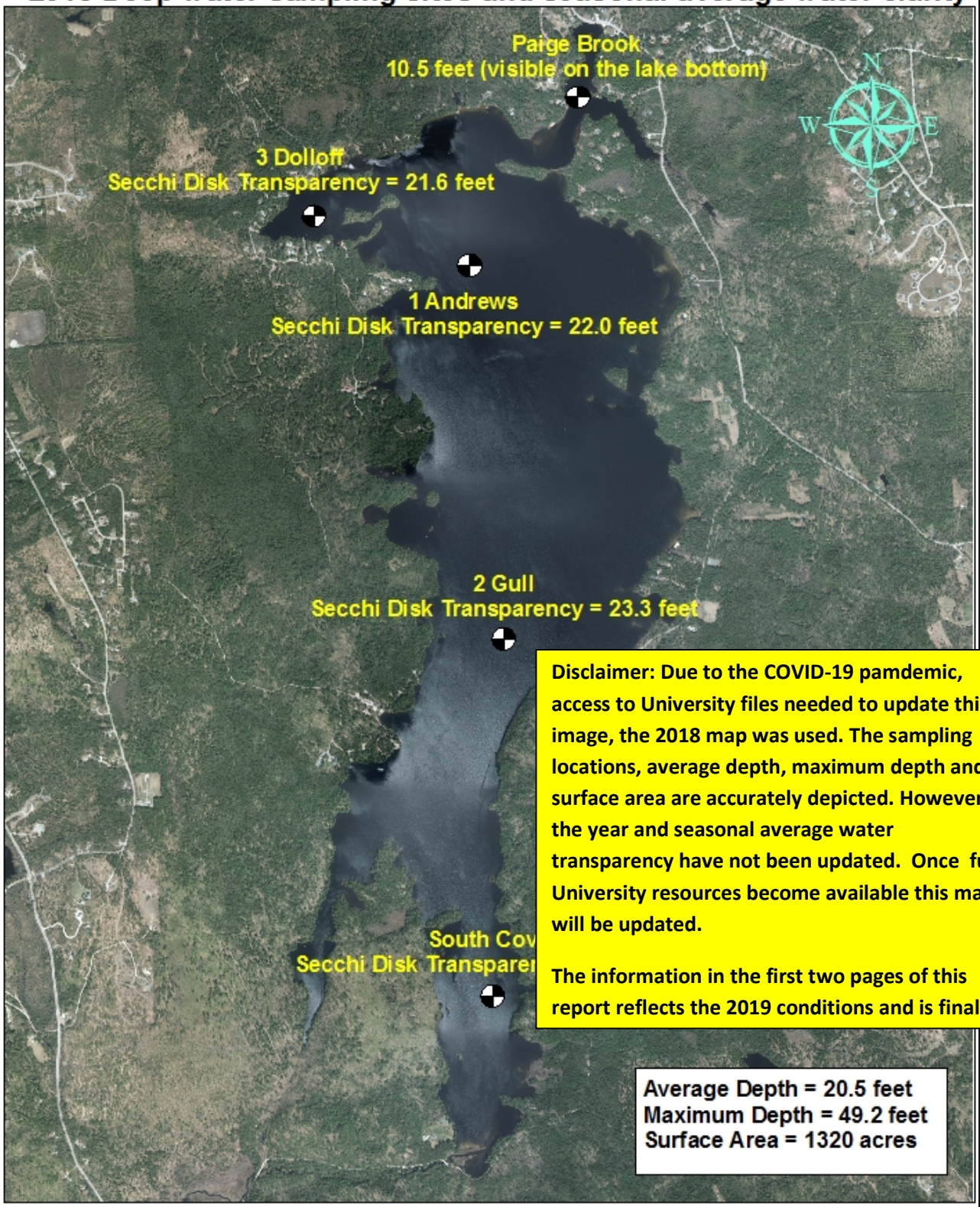
Implement Best Management Practices within the Conway Lake watershed to minimize the adverse impacts of polluted runoff and erosion into Conway Lake. Refer to "Landscaping at the Water's Edge: An Ecological Approach" and "New Hampshire Homeowner's Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home" for more information on how to reduce nutrient loading caused by overland run-off.

- https://www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf
- https://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf

# Figure 7. Conway Lake

## Conway & Eaton, NH

## 2018 Deep water sampling sites and seasonal average water clarity




Aerial Orthophoto Source: NH GRANIT
Site location GPS coordinates collected by the UNH Center for Freshwater Biology

NH Extension